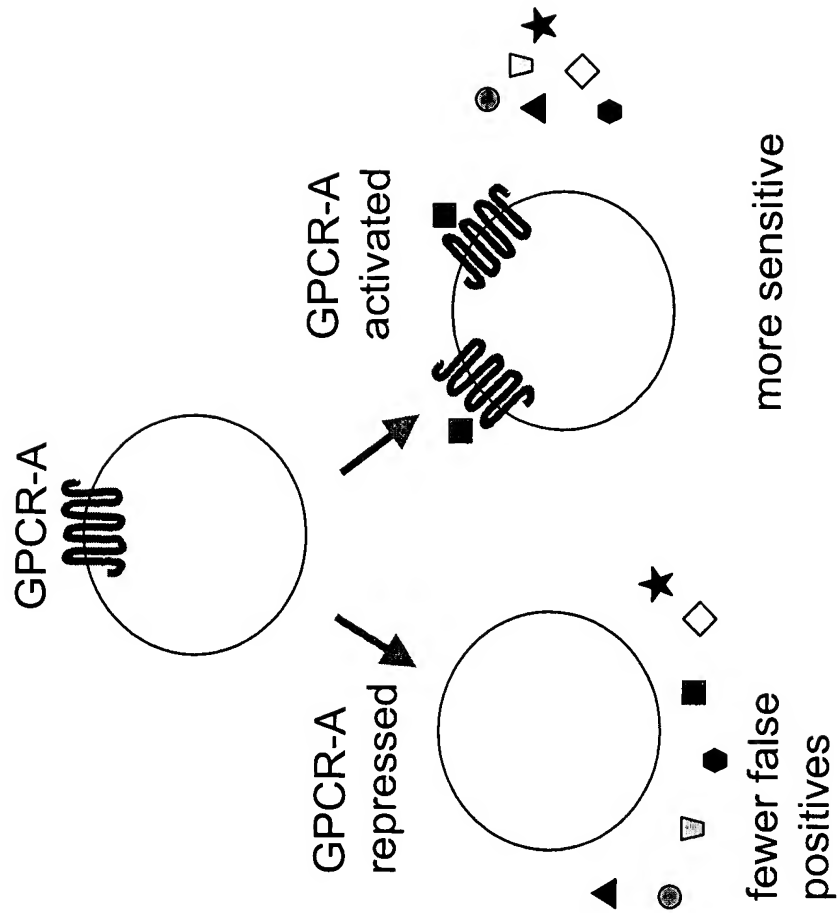
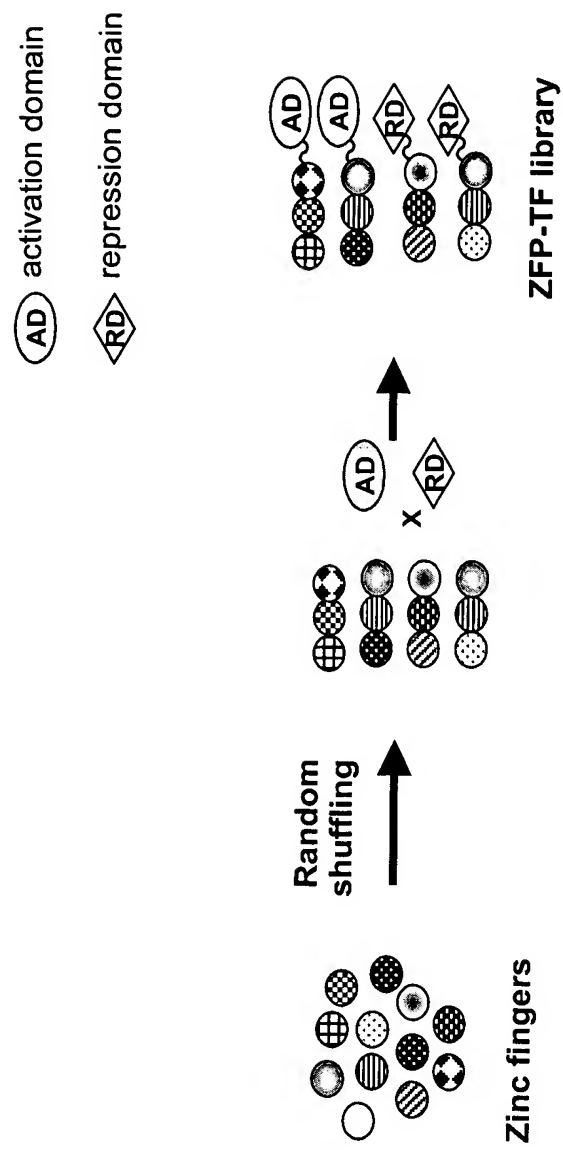


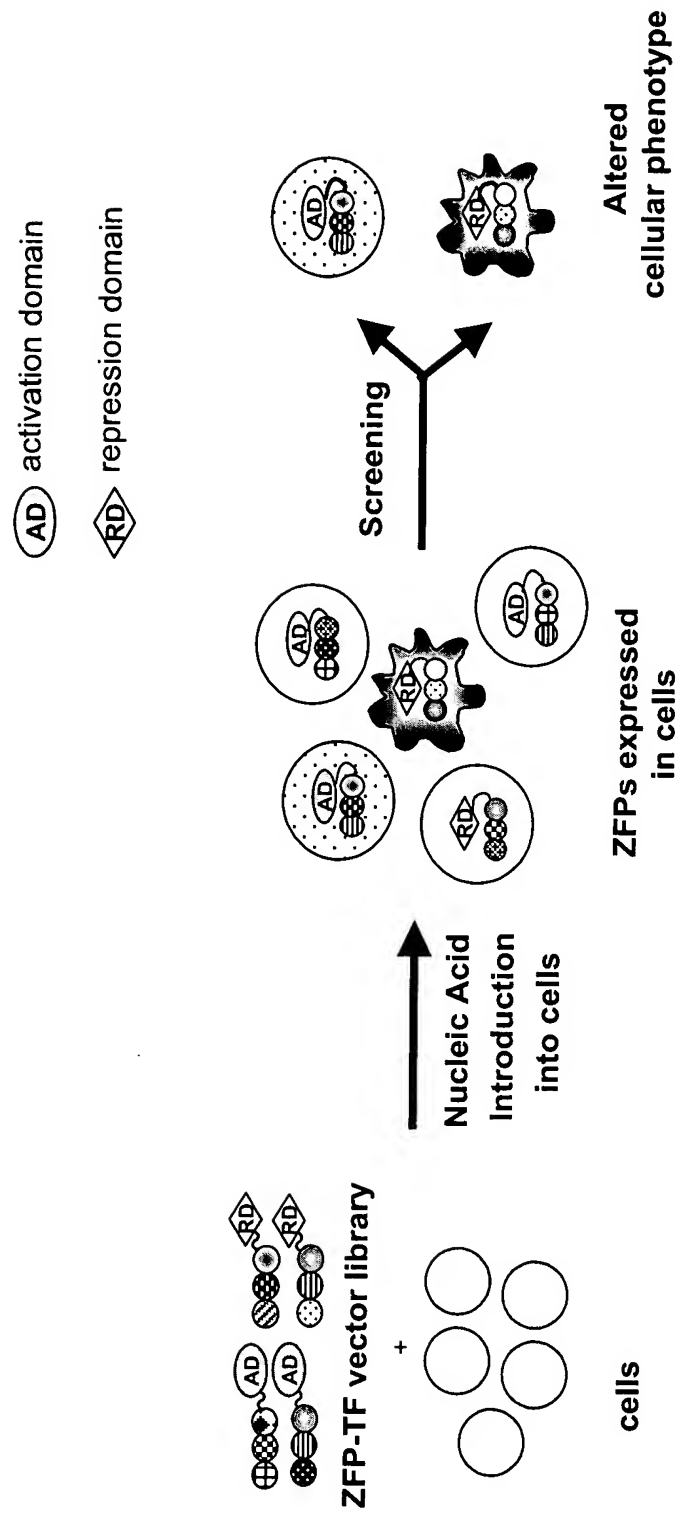
**FIG. 1**



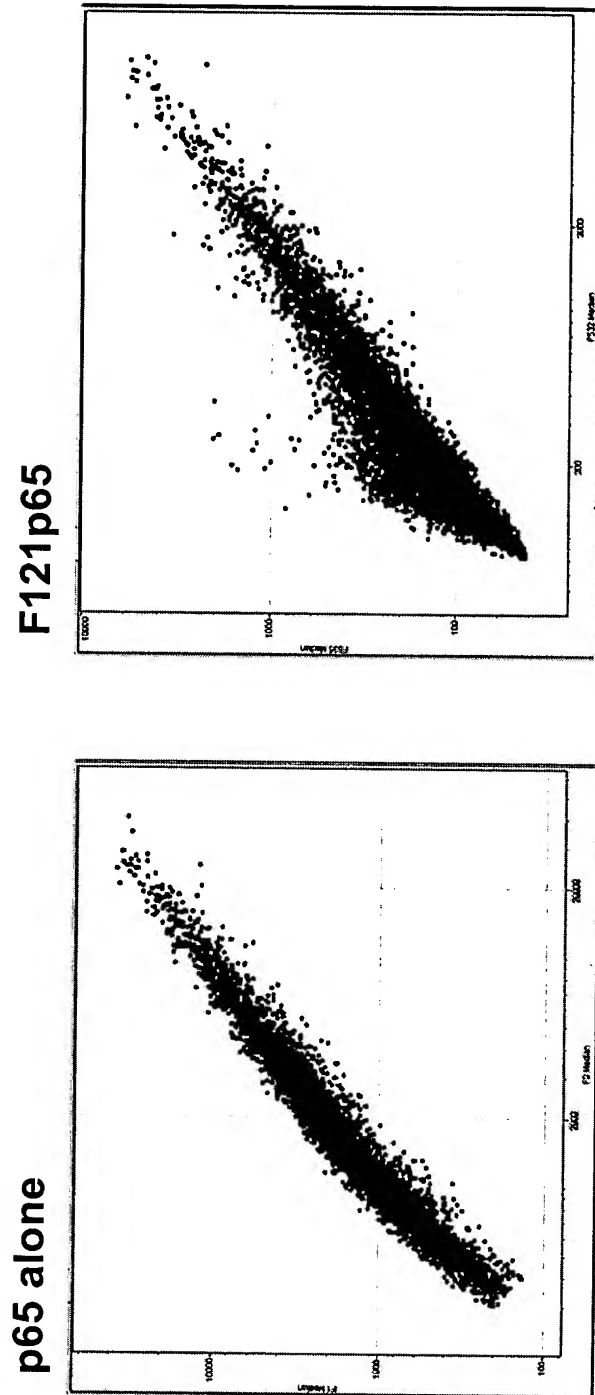
**FIG. 2**



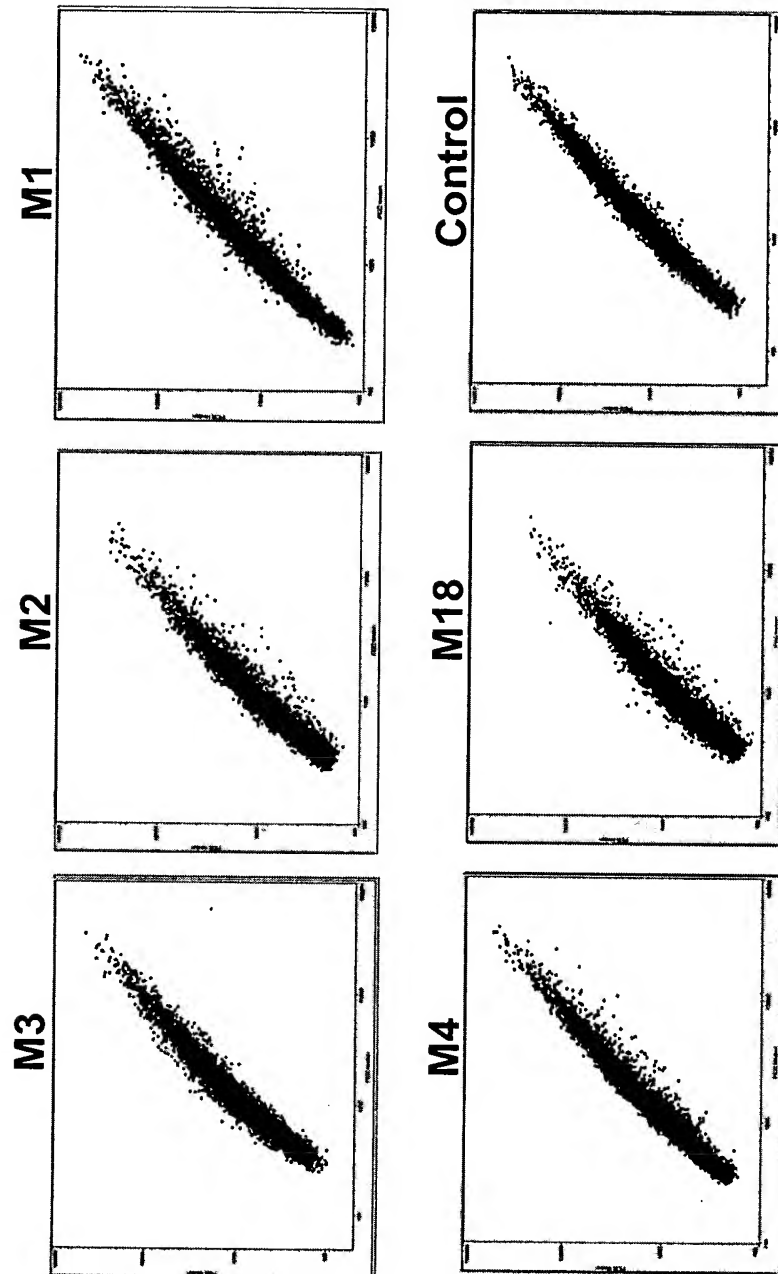
**FIG. 3A**



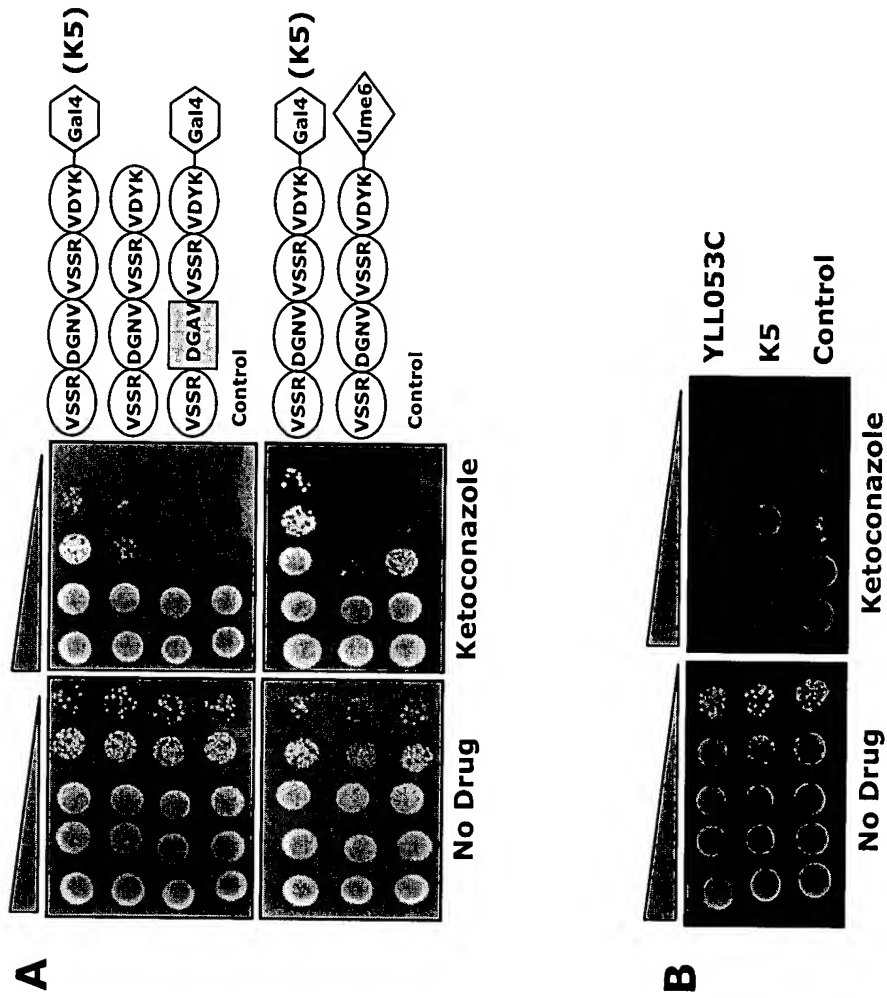
**FIG. 3B**



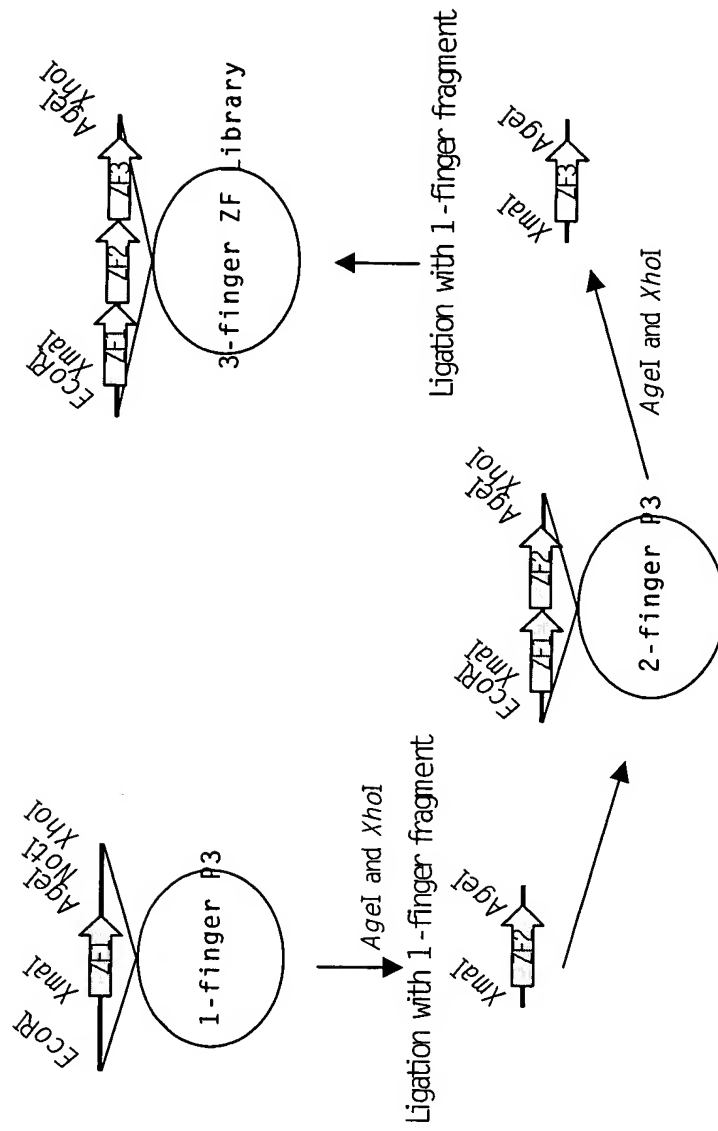
**FIG. 4**



**FIG. 5**

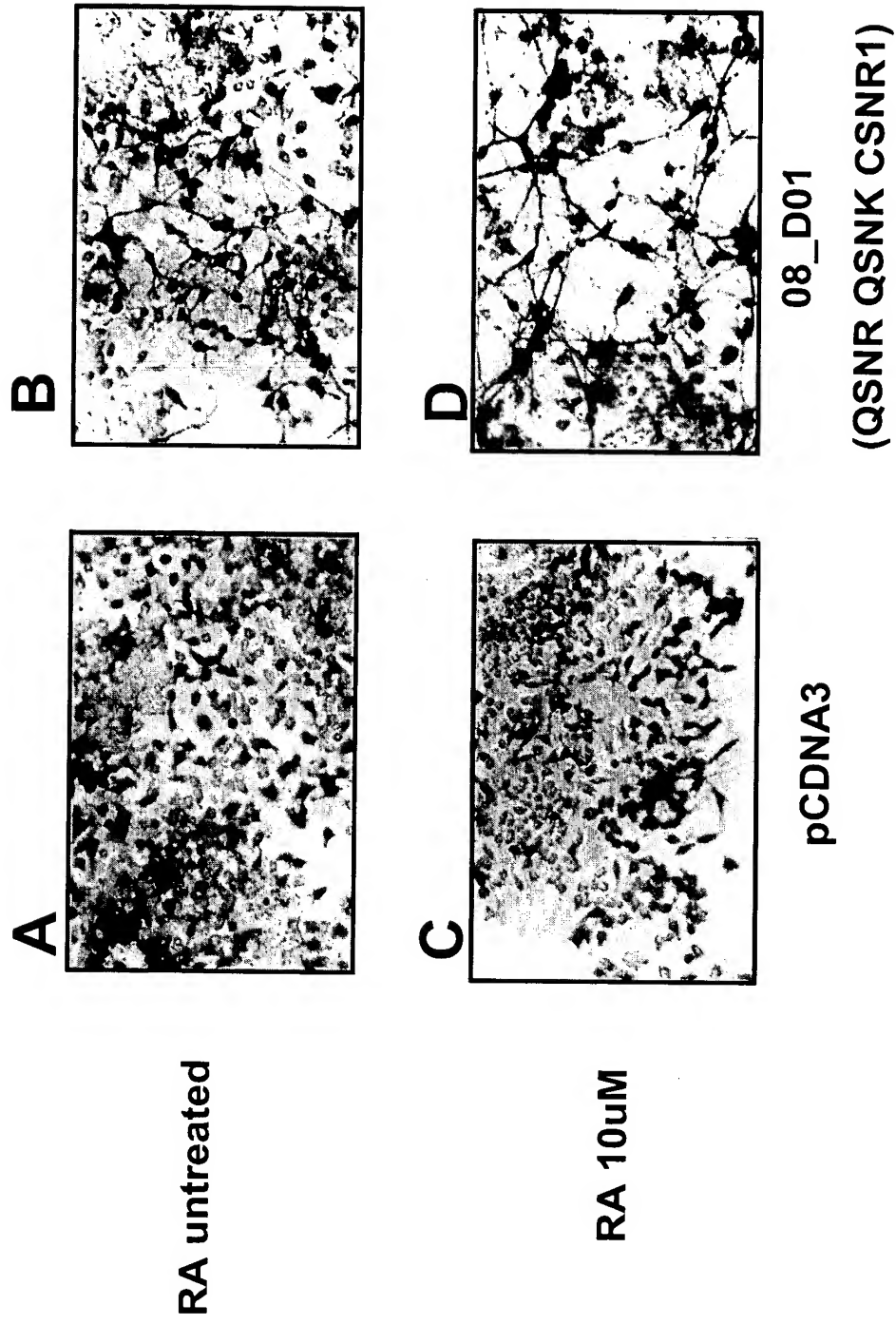


**FIG. 6**

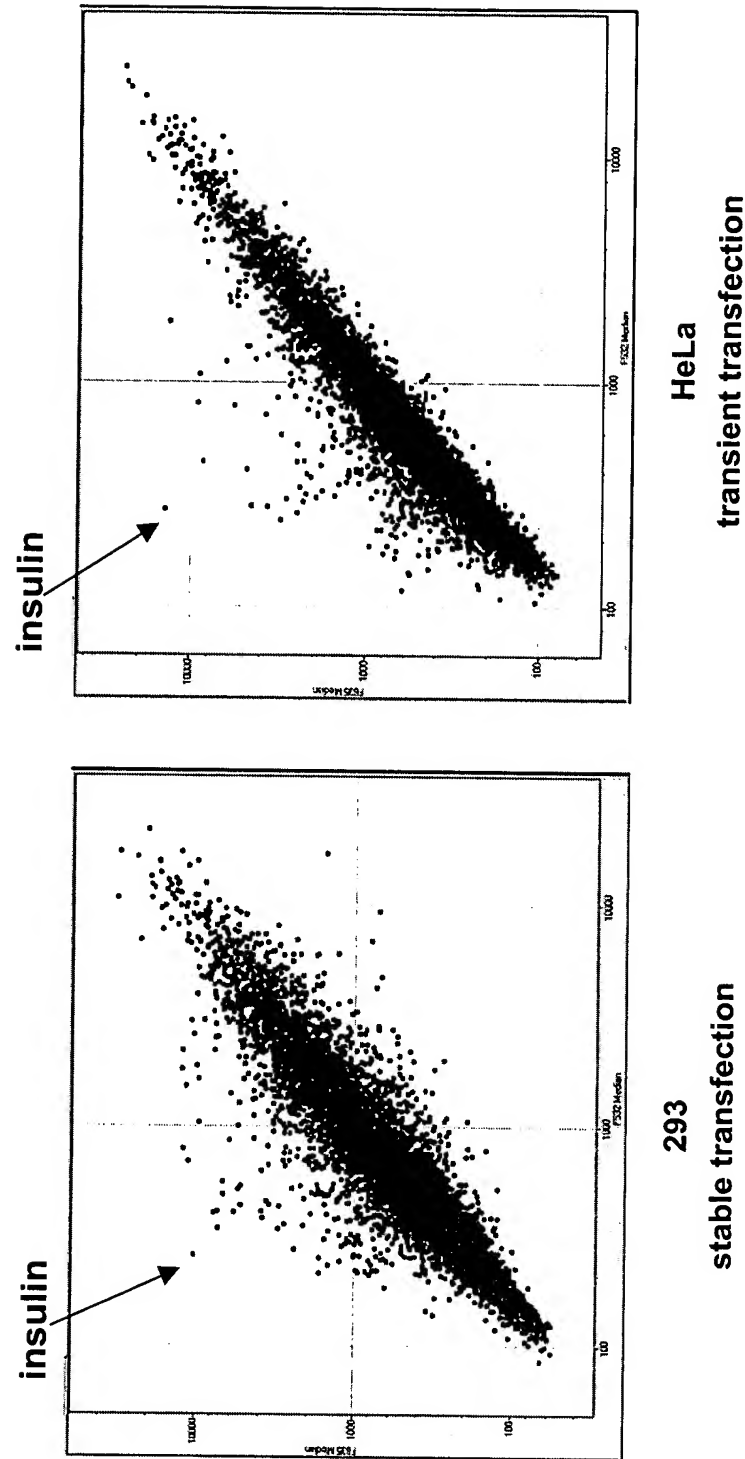


**FIG. 7**





**FIG. 8**



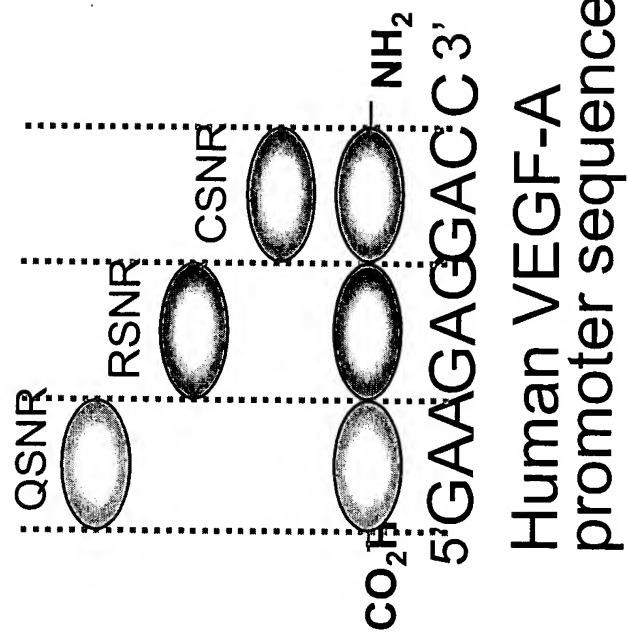
**FIG. 9**

**A partial directory of zinc  
finger-DNA interactions**

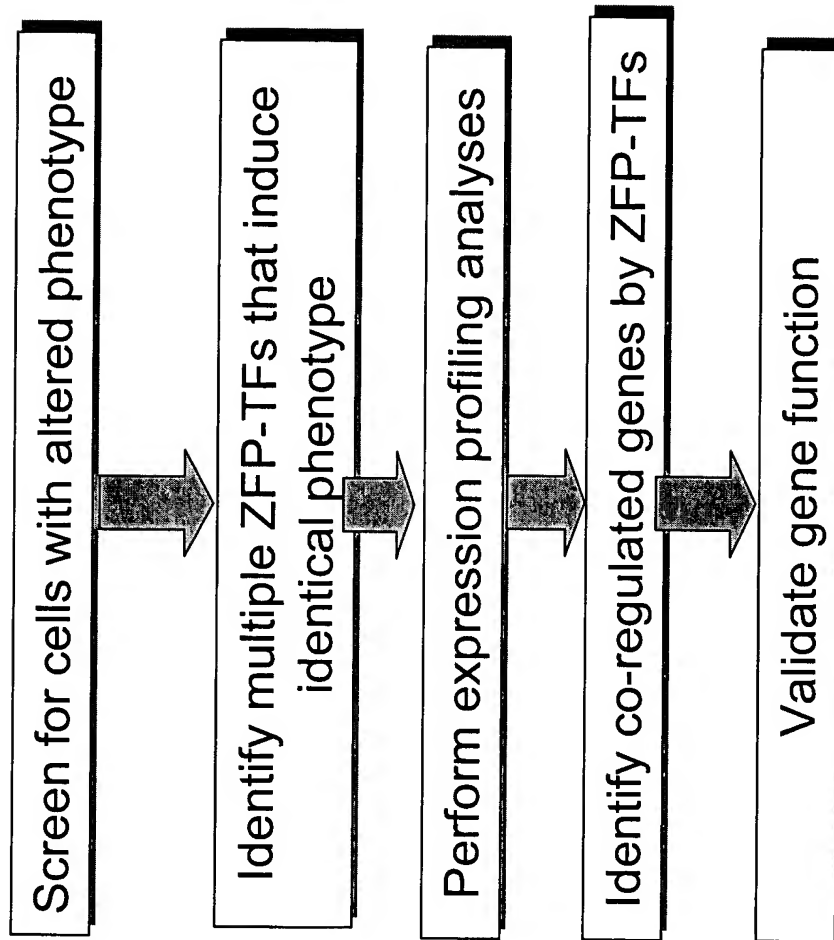
3-bp sequence	zinc finger
GAA	QSNR
GAC	CSNR
GAG	RSNR
GAT	ISNR
GCA	QSSR
GCC	-
GCG	RDER
GCT	VSTR

**FIG. 10A**

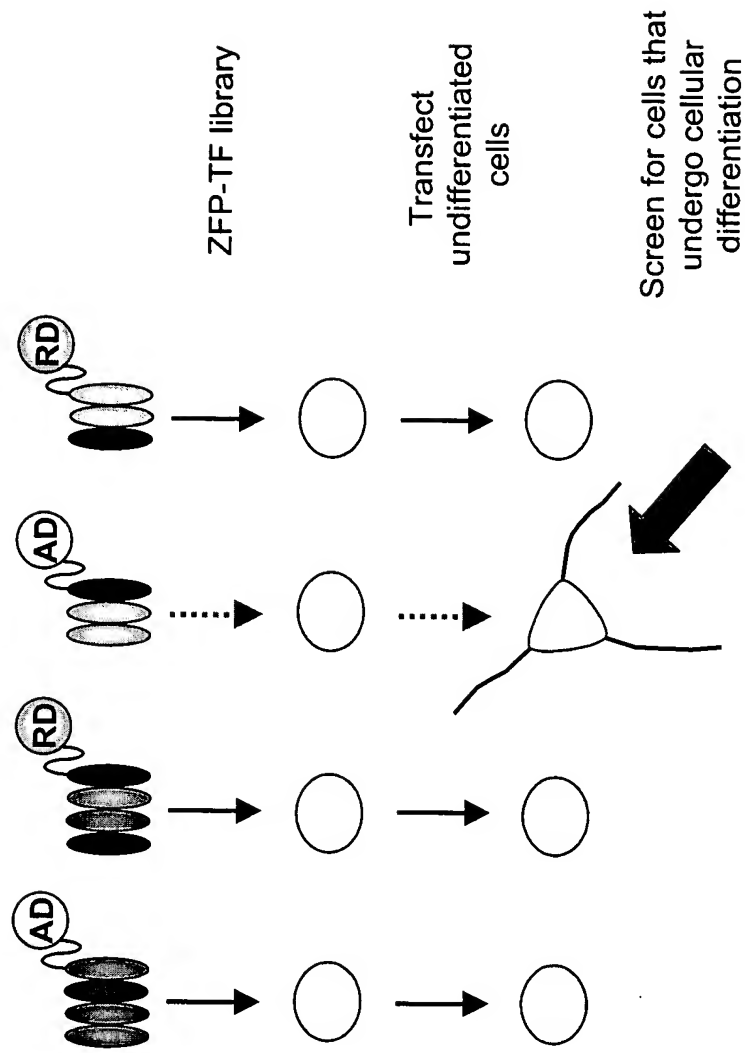
## Mixing and matching zinc fingers



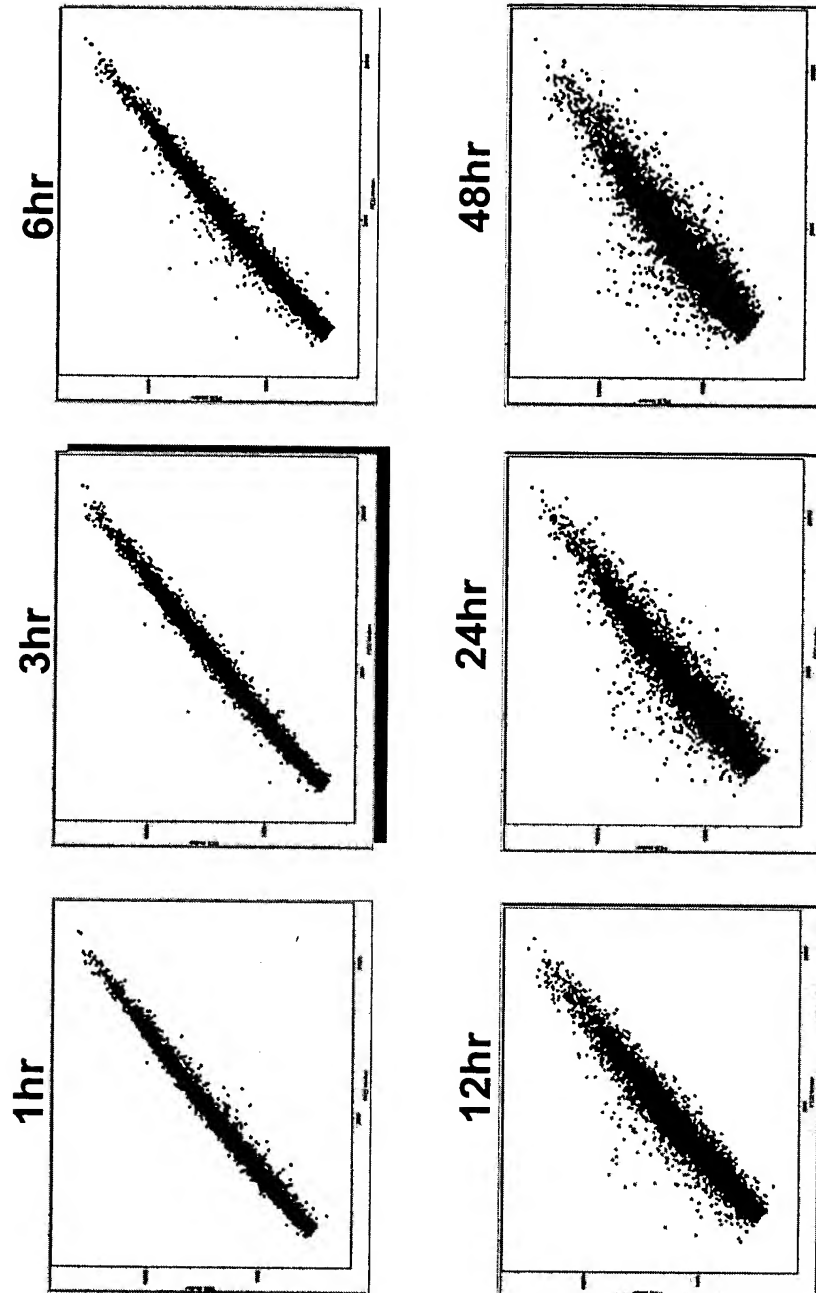
**FIG. 10B**



**FIG. 11**



**FIG. 12**



**FIG. 13**

## NEURO1-P65 (ALSO CALLED 08\_D1)

QSNR1-QSNK-CSNR1-p65

### NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCCGACTACGCCGAATTG[CCTCCAAAAAAGAAGAGAAAGGTA]GGG  
ATCCgaattcccggggaaaaaccgTTTGAGTGTAAGATTGCGGGAAAGCTTTCATTGAGAAGTCA  
AACCTCATCAGACACCAGAGAACTCACaccggggaaaaaccgTACAAGTGTGAAGAATGTGGCAAA  
GCTTTTACCCAATCTCAAACCTTACTAAACATAAGAAAATTCATaccggggaaaaaccgTATAAA  
TGTAAGCAATGTGGGAAAGCTTTTGGATGTCCCTCAAACCTTCGAAGGCATGGAAGGACTCACacc  
ggtgaaaaagcgggccgctaattcTACCTGCCAGATACAGACGATCGTCACCGGATTGAGGAGAAA  
CGTAAAAGGACATATGAGACCTTCAAGAGCATCATGAAGAAGAGTCCTTTCAGCGGACCCACCGAC  
CCCCGGCCTCCACCTCGACGCATTGCTGTGCCTTCCCGCAGCTCAGCTTCTGTCCCCAAGCCAGCA  
CCCCAGCCCTATCCCTTTACGTCATCCCTGAGCACCATCAACTATGATGAGTTTCCCACCATGGTG  
TTTCCTTCTGGGCAGATCAGCCAGGCCTCGGCCTTGGCCCCGGCCCCCTCCCCAAGTCCTGCCCCAG  
GCTCCAGCCCCTGCCCCTGCTCCAGCCATGGTATCAGCTCTGGCCCAGGCCCCAGCCCCTGTCCCA  
GTCCTAGCCCCAGGCCCTCCTCAGGCTGTGGCCCCACCTGCCCCCAAGCCACCAGGCTGGGGAA  
GGAACGCTGTCAGAGGCCCTGCTGCAGCTGCAGTTTGATGATGAAGACCTGGGGGCCTTGCTTGGC  
AACAGCACAGACCCAGCTGTGTTACAGACCTGGCATCCGTCGACAACTCCGAGTTTCAGCAGCTG  
CTGAACCAGGGCATACTGTGGCCCCCACACAACTGAGCCCATGCTGATGGAGTACCCTGAGGCT  
ATAACTCGCCTAGTGACAGCCCAGAGGCCCCCGACCCAGCTCCTGCTCCACTGGGGGGCCCCGGGG  
CTCCCCAATGGCCTCCTTTAGGAGATGAAGACTTCTCCTCCATTGCGGACATGGACTTCTCAGCC  
CTGCTGAGTCAG TAA (SEQ ID NO:1)

### PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKGIRIPGEKPFECKDCGKAFIQKSNLIRHQRTHTGEKPYKCEECGK  
AFTQSSNLTKHKKIHTGEKPYKCKQCGKAFGCPSNLRHGRTHHTGEKAAAKFYLPDTDDRHRRIEEK  
RKRTYETFKSIMKKS PFSGPTDPRPPPRRIAVPSRSSASVPKPAPQYPPTSSLSTINYDEFPTMV  
FPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGE  
GTLSEALLQLQFDDDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGI PVAPHTTEPMLMEYPEA  
ITRLVTAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLSQ (SEQ ID NO:2)

FIG. 14



# OSTEO1-P65 (ALSO CALLED S045-15-D11 )

RDKR-QTHR1-VSTR-RDKR-p65

## NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCCACTACGCCGAATTG CCTCCAAAAAGAAGAGAAAGGTA GGG  
ATCCgaattcccggggaaaaaccgTATGTATGCGATGTAGAGGGATGTACGTGGAAATTTGCCCGC  
TCAGATAAGCTCAACAGACACAAGAAAAGGCACaccggggaaaaaccgTATGAGTGTACGATTGC  
GGAAAGTCCTTTTAGGCAGAGCACCCACCTCACTCGGCACCGGAGGATCCACaccggggaaaaaccg  
TATGAGTGTAAATTACTGTGAAAAACCTTTAGTGTGAGCTCAACCCTTATTAGACATCAGAGAATC  
CACaccggggaaaaaccgTATGTATGCGATGTAGAGGGATGTACGTGGAAATTTGCCCGCTCAGAT  
AAGCTCAACAGACACAAGAAAAGGCACaccggtgaaaaagcgggcgctaaattcTACCTGCCAGAT  
ACAGACGATCGTCACCGGATTGAGGAGAAACGTAAAAGGACATATGAGACCTTCAAGAGCATCATG  
AAGAAGAGTCCTTTTACGCGGACCCACCGACCCCGGCCCTCCACCTCGACGCATTGCTGTGCCTTCC  
CGCAGCTCAGCTTCTGTCCCCAAGCCAGCACCCAGCCCTATCCCTTTACGTCATCCCTGAGCACC  
ATCAACTATGATGAGTTTCCCACCATGGTGTTTCTTCTGGGCAGATCAGCCAGGCCTCGGCCTTG  
GCCCCGGCCCCCTCCCCAAGTCCTGCCCCAGGCTCCAGCCCCTGCCCCCTGCTCCAGCCATGGTATCA  
GCTCTGGCCCAGGCCCCAGCCCCTGTCCCAGTCCTAGCCCCAGGCCCTCCTCAGGCTGTGGCCCCA  
CCTGCCCCCAAGCCCACCCAGGCTGGGGAAGGAACGCTGTGAGAGGCCCTGCTGCAGCTGCAGTTT  
GATGATGAAGACCTGGGGGCCTTGCTTGGCAACAGCACAGACCCAGCTGTGTTCACAGACCTGGCA  
TCCGTCGACAACTCCGAGTTTCAGCAGCTGCTGAACCAGGGCATACTGTGGCCCCCACACAAC  
GAGCCCATGCTGATGGAGTACCCTGAGGCTATAACTCGCCTAGTGACAGCCAGAGGCCCCCCGAC  
CCAGCTCCTGCTCCACTGGGGGCCCCGGGGCTCCCCAATGGCCTCCTTTACAGGAGATGAAGACTTC  
TCCTCCATTGCGGACATGGACTTCTCAGCCCTGCTGAGTCAG TAA (SEQ ID NO:3)

## PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKP YVCDVEGCTWKFARSDKLNHRHKKRHTGEKP  
YEC HDCGKSFRQSTHLTRHRIHTGEKP YECNYCGKTFVSSTLIRHQRIHTGEKP YVCD  
VEGCTWKFARSDKLNHRHKKRHTGEKAAAFYLPD TDDRHRIEEKRKRTYETFKSIMKKSP  
FSGPTDPRPPPRRIAVPSRSSASVPKPAPQYPFTSSLSTINYDEFPTMVFP SGQISQAS  
ALAPAPPQVLFPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLS  
EALLQLQFDDLDL GALLGNSTDPVFTDLASVDNSEFQQLNQGIPVAPHTTEPMLMEYP  
EAITRLVTAQRPPDPAPAPL GAPGLPNGLLSGDEDFSSIADMDFSALLSQ (SEQ ID NO:4)

FIG. 15

08\_D04\_p65:

RSHR-RDHT-VSSR-p65

#### NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCGACTACGCCGAATTG CCTCCAAAAAAGAAGAGAAAGGTA GGG  
ATCCgaattcccggggaaaaaccgTATAAGTGCATGGAGTGTGGGAAGGCTTTTAACCGCAGGTCA  
CACCTCACACGGCACCAGCGGATTACaccgggggaaaaaccgTTCCAGTGTAAACTTGTCAGCGA  
AAGTTCTCCCGTCCGACCACCTGAAGACCCACACCAGGACTCATaccgggggaaaaaccgTATACA  
TGTAACAGTGTGGGAAAGCCTTCAGTGTTCAGTTCCCTTCGAAGACATGAAACCACTCACacc  
ggtgaaaaagcgggccgctaaattcTACCTGCCAGATACAGACGATCGTCACCGGATTGAGGAGAAA  
CGTAAAAGGACATATGAGACCTTCAAGAGCATCATGAAGAAGAGTCCTTTCAGCGGACCCACCGAC  
CCCCGGCCTCCACCTCGACGCATTGCTGTGCCTTCCCGCAGCTCAGCTTCTGTCCCAAGCCAGCA  
CCCCAGCCCTATCCCTTTACGTCATCCCTGAGCACCATCAACTATGATGAGTTTCCCACCATGGTG  
TTTCCTTCTGGGCAGATCAGCCAGGCCTCGGCCTTGGCCCCGGCCCCCTCCCAAGTCCTGCCCCAG  
GCTCCAGCCCCTGCCCCTGCTCCAGCCATGGTATCAGCTCTGGCCCAGGCCCCAGCCCCTGTCCCA  
GTCCTAGCCCCAGGCCCTCCTCAGGCTGTGGCCCCACCTGCCCCAAGCCCACCCAGGCTGGGGAA  
GGAACGCTGTCAGAGGCCCTGCTGCAGCTGCAGTTTGATGATGAAGACCTGGGGGCCTTGCTTGGC  
AACAGCACAGACCCAGCTGTGTTACAGACCTGGCATCCGTCGACAACTCCGAGTTTTCAGCAGCTG  
CTGAACCAGGGCATACTGTGGCCCCCACAACTGAGCCCATGCTGATGGAGTACCCTGAGGCT  
ATAACTCGCCTAGTGACAGCCAGAGGCCCCCGACCCAGCTCCTGCTCCACTGGGGGCCCCGGGG  
CTCCCCAATGGCCTCCTTTTCAGGAGATGAAGACTTCTCCTCCATTGCGGACATGGACTTCTCAGCC  
CTGCTGAGTCAG TAA (SEQ ID NO:5)

#### PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKPYKCMCEGKAFNRRSHLTRHQRIHTGEKPFQCKTCQR  
KFSRSDHLKTHTRHTGEKPYTCKQCGKA FSVSSSLRRHETHTGEKAAAKFYLPD TDDRHRIEEK  
RKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQYPFTSSLSTINYDEFPTMV  
FPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGE  
GTLSEALLQLQFDDDLGALLGNSTDAVF TDLASVDNSEFQQLLNQGI PVAPHTTEPMLMEYPEA  
ITRLVTAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLSQ (SEQ ID NO:6)

FIG. 16

Name: P\_B08

QSNR1-DSNR-DSNR-p65

# NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCGACTACGCCGAATTG CCTCCAAAAAAGAAGAGAAAGGTA GGG  
ATCCgaattcccggggaaaaaccgTTTGAGTGTAAGATTGCGGGAAAGCTTTCATTTCAGAAGTCA  
AACCTCATCAGACACCAGAGAACTCACaccgggggaaaaaccgTATGCTTGCCCTGTCGAGTCTCGC  
GATCGCCGCTTTTCTGATTCTGTCGAACCTTACCCGCCATATCCGCATCCACaccgggggaaaaaccg  
TATGCTTGCCCTGTCGAGTCTGCGATCGCCGCTTTTCTGATTCTGTCGAACCTTACCCGCCATATC  
CGCATCCACaccggtgaaaaagcgggccgctaaattcTACCTGCCAGATACAGACGATCGTCACCGG  
ATTGAGGAGAAACGTAAAAGGACATATGAGACCTTCAAGAGCATCATGAAGAAGAGTCTTTTCAGC  
GGACCCACCGACCCCCGGCCTCCACCTCGACGCATTGCTGTGCCTTCCCGCAGCTCAGCTTCTGTC  
CCCAAGCCAGCACCCAGCCCTATCCCTTACGTCATCCCTGAGCACCATCAACTATGATGAGTTT  
CCCACCATGGTGTTTCTTCTGGGCAGATCAGCCAGGCCTCGGCCTTGGCCCCGGCCCCCTCCCCAA  
GTCCTGCCCCAGGCTCCAGCCCCTGCCCTGCTCCAGCCATGGTATCAGCTCTGGCCCAGGCCCCA  
GCCCCCTGTCCAGTCCTAGCCCCAGGCCCTCCTCAGGCTGTGGCCCCACCTGCCCCCAAGCCCACC  
CAGGCTGGGGAAGGAACGCTGTCAGAGGCCCTGCTGCAGCTGCAGTTTGATGATGAAGACCTGGGG  
GCCTTGCTTGGCAACAGCACAGACCCAGCTGTGTTACAGACCTGGCATCCGTCGACAACCTCCGAG  
TTTTCAGCAGCTGCTGAACCAGGGCATACTGTGGCCCCCACACAACCTGAGCCCATGCTGATGGAG  
TACCCTGAGGCTATAACTCGCCTAGTGACAGCCAGAGGCCCCCCGACCCAGCTCCTGCTCCACTG  
GGGGCCCCGGGGCTCCCCAATGGCCTCCTTTCAGGAGATGAAGACTTCTCCTCCATTGCGGACATG  
GACTTCTCAGCCCTGCTGAGTCAG TAA (SEQ ID NO:7)

# PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKP FECKDCGKAFTQKSNLIRHQRTHTGEKPYACPVESC  
DRRFSDSLTRHIRIHTGEKPYACPVESCDRRFSDSLTRHIRIHTGEKAAKFYLPDTDDRHR  
IEEKRKRTYETFKSIMKKSPPSGPTDPRPPPRRIAVPSRSSASVPKPAPQYPFTSSLSTINYDEF  
PTMVFPSGQISQASALAPAPPOVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPT  
QAGEGTLSEALLQLQFDDDLGALLGNSTDPVFTDLASVDNSEFQQLLNQGI PVAPHTTEPMLME  
YPEAITRLVTAQRPPDPAPAPLGPGLPNGLLSGDEDFSSIADMDFSALLSQ (SEQ ID NO:8)

FIG. 17

Name: K\_D10

QSHV-WSNR-WSNR-RDNQ-kid

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCGACTACGCCGAATTG CCTCCAAAAAAGAAGAGAAAGGTA GGG  
ATCCgaattcccggggaaaaaccgTATGAGTGTGATCACTGTGGAAATCCTTTAGCCAGAGCTCT  
CATCTGAATGTGCACAAAAGAACTCACaccgggggaaaaaccgTACAGATGTGAGGAATGTGGCAAA  
GCCTTTAGGTGGCCCTCAAACCTTACTAGACATAAGAGAATTCACaccgggggaaaaaccgTACAGA  
TGTGAGGAATGTGGCAAAGCCTTTAGGTGGCCCTCAAACCTTACTAGACATAAGAGAATTCACacc  
gggggaaaaaccgTTTGCCTGCCCTGAGTGTCTAAGCGCTTCATGAGATCCGACAACCTGACCCAG  
CATATCAAGACCCACaccggtgaaaaagcgggccgctaaattcGTGTCAGTGACATTTGAAGATGTG  
GCTGTGCTCTTTACTCGGGACGAGTGGAAGAAGCTGGATCTGTCTCAGAGAAGCCTGTACCGTGAG  
GTGATGCTGGAGAATTACAGCAACCTGGCCTCCATGGCAGGATTCCTGTTTACCAAACCAAAGGTG  
ATCTCCCTGTTGCAGCAAGGAGAGGATCCCTGGTAA (SEQ ID NO:9)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKP YECDHCGKSFSQSSHLNVHKRTHTGEKPYRCEECK  
AFRWPSNLTRHKRIHTGEKPYRCEECKAFRWPSNLTRHKRIHTGEKPFACPECPKRFRMRSDNLTO  
HIKTHTEKAAAKFVSVTFEDVAVLFTRDEWKKLDLSQRSLYREVMLENYSNLASMAGFLFTKPKV  
ISLLQQGEDPW (SEQ ID NO:10)

FIG. 18

Name: K\_F02

DSAR2-RDKR-RDER1-QTHR1-kid

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCCGACTACGCCGAATTG CCTCCAAAAAAGAAGAGAAAGGTA GGG  
ATCCgaattcccggggaaaaaccgTACTCCTGTGGCATTGTGGCAAATCCTTCTCTGACTCCAGT  
GCCAAAAGGAGACACTGCATTCTACACaccggggaaaaaccgTATGTATGCGATGTAGAGGGATGT  
ACGTGGAAATTTGCCCGCTCAGATAAGCTCAACAGACACAAGAAAAGGCACaccggggaaaaaccg  
TATGTATGCGATGTAGAGGGATGTACGTGGAAATTTGCCCGCTCAGATGAGCTCAACAGACACAAG  
AAAAGGCACaccggggaaaaaccgTATGAGTGTACGATTGCGGAAAGTCCTTTAGGCAGAGCACC  
CACCTCACTCGGCACCGGAGGATCCACaccggtgaaaaagcgggccgctaaattcGTGTCAGTGACA  
TTTGAAGATGTGGCTGTGCTCTTTACTCGGGACGAGTGGAAGAAGCTGGATCTGTCTCAGAGAAGC  
CTGTACCGTGAGGTGATGCTGGAGAATTACAGCAACCTGGCCTCCATGGCAGGATTCCTGTTTACC  
AAACCAAAGGTGATCTCCCTGTTGCAGCAAGGAGAGGATCCCTGGTAA (SEQ ID NO:11)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKP YSCGICGKSFS DSSAKRRHCILHTGEKP YVCDVEGC  
TWKFARSDKLN RHKKRHTGEKP YVCDVEGCTWKFARSD ELNRHKKRHTGEKP YECHDCGKSFRQST  
HLTRHRR IHTGEKAAAKFVSVTFEDVAVLFTRDEWKKLDLSQRS LYREVMLENYSNLASMAGFLFT  
KPKVISLLQQGEDPW (SEQ ID NO:12)

FIG. 19

Name: K 44\_11\_D01

QSHV-QSNI-QTHR1-CSNR1-K1D

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCCGACTACGCCGAATTGCCTCCAAAAAAGAAGAGAAAGGTAGGG  
ATCCgaattcccggggaaaaaccgTATGAGTGTGATCACTGTGGAAATCCTTTAGCCAGAGCTCT  
CATCTGAATGTGCACAAAAGAACTCACaccgggggaaaaaccgTACATGTGCAGTGAGTGTGGGCGA  
GGCTTCAGCCAGAAGTCAAACCTCATCATACACCAGAGGACACACaccgggggaaaaaccgTATGAG  
TGTACGATTGCGGAAAGTCCTTTAGGCAGAGACCCACCTCACTCGGCACCGGAGGATCCACacc  
ggggaaaaaccgTATAAATGTAAGCAATGTGGGAAAGCTTTTGGATGTCCCTCAAACCTTCGAAGG  
CATGGAAGGACTCACaccggtgaaaaagcgggcgctaaattcGTGTCAGTGACATTTGAAGATGTG  
GCTGTGCTCTTTACTCGGGACGAGTGGAAGAAGCTGGATCTGTCTCAGAGAAGCCTGTACCGTGAG  
GTGATGCTGGAGAATTACAGCAACCTGGCCTCCATGGCAGGATTCCTGTTTACCAAACCAAAGGTG  
ATCTCCCTGTTGCAGCAAGGAGAGGATCCCTGGTAA (SEQ ID NO:13)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKPYECDHCGKSFSQSSHLNVHKRTHTGEKP~~YMCSECGR~~  
GFSQKSNLI IHQRTHTGEKPYECHDCGKSFRQSTHLTRHRRHTHTGEKPYKCKQCGKAFGCPSNLRR  
HGRTHTGEKAAAKEFVSVTFEDVAVLFTRDEWKKLDLSQRSLYREVMLENYSNLASMAGFLFTKPKV  
ISLLQQGEDPW (SEQ ID NO:14)

FIG. 20

Name: K 44\_11\_G12

QSHV-VSTR-RDNQ-QTHR1-kid

NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCCACTACGCCGAATTGCCTCCAAAAAAGAAGAGAA  
AGGTAGGGATCCgaattcccggggaaaaaccgTATGAGTGTGATCACTGTGGAAAATCCTTTAGCC  
AGAGCTCTCATCTGAATGTGCACAAAAGAACTCACaccggggaaaaaccgTATGAGTGTAAATTA  
CTGTGGAAAAACCTTTAGTGTGAGCTCAACCCTTATTAGACATCAGAGAATCCACaccggg  
gaaaaaccgTTTGCCTGCCCTGAGTGTCTAAGCGCTTCATGAGATCCGACAACCTGACCCA  
GATATCAAGACCCACaccggggaaaaaccgTATGAGTGTACGATTGCGGAAAGTCCTTTAGG  
CAGAGCACCCACCTCACTCGGCACCGGAGGATCCACaccggtgaaaaagcgccgctaattcGTGTC  
AGTGACATTTGAAGATGTGGCTGTGCTCTTTACTCGGGACGAGTGGAAGAAGCTGGATC  
TGTCTCAGAGAAGCCTGTACCGTGAGGTGATGCTGGAGAATTACAGCAACCTGGCCTCC  
ATGGCAGGATTCCTGTTTACCAAACCAAAGGTGATCTCCCTGTTGCAGCAAGGAGAGGA  
TCCCTGGTAA (SEQ ID NO:15)

PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKPYECDHCGKSFSQSSHLNVHKRTHTGEKPYECNYCGK  
TFSVSSTLIRHQRIHTGEKPFACPECPKRFMRSDNLQHIKTHTGEKPYECDHCGKSFRQSTHLTR  
HRRIHTGEKAAAKFVSVTFEDVAVLFTRDEWKKLDLSQRSLYREVMLENYSNLASMAGFLFTKPKV  
ISLLQQGEDPW (SEQ ID NO:16)

**FIG. 21**

F104\_p65

RDHT-RSHR-QSHR2-p65

### NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCCGACTACGCCGAATTG[CCTCCAAAAAGAAGAGAAAGGTA]GGG  
ATCC**gaattc**ccgggggaaaaaccgTTCCAGTGTAAACTTGTCAGCGAAAGTTCTCCCGGTCCGAC  
CACCTGAAGACCCACACCAGGACTCATaccgggggaaaaaccgTATAAGTGCATGGAGTGTGGGAAG  
GCTTTTAACCGCAGGTACACCTCACACGGCACCAGCGGATTCACaccgggggaaaaaccgTATAAA  
TGCGGCCAGTGTGGGAAGTTCTACTCGCAGGTCTCCACCTCACCCGCCACCAGAAAATCCACacc  
ggtgaaaaag**cgggccgc**taaatcTACCTGCCAGATACAGACGATCGTCACCGGATTGAGGAGAAA  
CGTAAAGGACATATGAGACCTTCAAGAGCATCATGAAGAAGAGTCCTTTCAGCGGACCCACCGAC  
CCCCGGCCTCCACCTCGACGCATTGCTGTGCCTTCCCGCAGCTCAGCTTCTGTCCCCAAGCCAGCA  
CCCCAGCCCTATCCCTTTACGTCATCCCTGAGCACCATCAACTATGATGAGTTTCCCACCATGGTG  
TTTCCTTCTGGGCAGATCAGCCAGGCCCTCGGCCTTGGCCCCGGCCCCCTCCCAAGTCCTGCCCCAG  
GCTCCAGCCCCTGCCCCTGCTCCAGCCATGGTATCAGCTCTGGCCCAGGCCCCAGCCCCTGTCCCA  
GTCCTAGCCCCAGGCCCTCCTCAGGCTGTGGCCCCACCTGCCCCCAAGCCCACCAGGCTGGGGAA  
GGAACGCTGTCAGAGGCCCTGCTGCAGCTGCAGTTTGATGATGAAGACCTGGGGGCCTTGCTTGGC  
AACAGCACAGACCCAGCTGTGTTACAGACCTGGCATCCGTCGACAACTCCGAGTTTCAGCAGCTG  
CTGAACCAGGGCATACTGTGGCCCCCACACAACTGAGCCCATGCTGATGGAGTACCCTGAGGCT  
ATAACTCGCCTAGTGACAGCCAGAGGCCCCCGACCCAGCTCCTGCTCCACTGGGGGCCCCGGGG  
CTCCCCAATGGCCTCCTTTCAGGAGATGAAGACTTCTCCTCCATTGCGGACATGGACTTCTCAGCC  
CTGCTGAGTCAG TAA (SEQ ID NO:17)

### PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKP**FQCKTCQRKFSRSDHLKTHTRHT**GEKP**YKCMCEGK**  
**AFNRRSHLTRHQRIHT**GEKP**YKCGQCGKFYSQVSHLTRHQKIHT**GEKAAAKFYLPDTPDRHRIEEK  
RKRTYETFKSIMKKSFPSPGPTDPRPPPRRIAVPSRSSASVPKPAPQYPPTSSSLSTINYDEFPTMV  
FPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGE  
GTLSEALLQLQFDDDELGALLGNSTDPAVFTDLASVDNSEFQQLLNOGIPVAPHTTEPMLMEYPEA  
ITRLVTAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLSQ (SEQ ID NO:18)

**FIG. 22**



F121\_p65

QSHR-RSHR-RDHT-p65

#### NUCLEIC ACID SEQUENCE

ATGGTGTACCCCTACGACGTGCCCGACTACGCCGAATTGCTCCAAAAAGAAGAGAAAGGTAGGG  
ATCCgaattcccggggaaaaaccgTACAAATGTGAAGAATGTGGCAAAGCCTTTAGGCAGTCCCTCA  
CACCTTACTACACATAAGATAATTCATaccggggaaaaaccgTATAAGTGCATGGAGTGTGGGAAG  
GCTTTTAACCGCAGGTCACACCTCACACGGCACCAGCGGATTCACaccggggaaaaaccgTTCCAG  
TGTAAAACTTGTACGCGAAAGTTCTCCCGGTCCGACCACCTGAAGACCCACACCAGGACTCATacc  
ggtgaaaaagcgggccgctaaattcTACCTGCCAGATACAGACGATCGTCACCGGATTGAGGAGAAA  
CGTAAAGGACATATGAGACCTTCAAGAGCATCATGAAGAAGAGTCCTTTCAGCGGACCCACCGAC  
CCCCGGCCTCCACCTCGACGCATTGCTGTGCCTTCCCGCAGCTCAGCTTCTGTCCCAAGCCAGCA  
CCCCAGCCCTATCCCTTTACGTCATCCCTGAGCACCATCAACTATGATGAGTTTCCCACCATGGTG  
TTTCCTTCTGGGCAGATCAGCCAGGCCTCGGCCTTGGCCCCGGCCCCCTCCCAAGTCCTGCCCCAG  
GCTCCAGCCCCTGCCCCCTGCTCCAGCCATGGTATCAGCTCTGGCCCAGGCCCCAGCCCCTGTCCCA  
GTCCTAGCCCCAGGCCCTCCTCAGGCTGTGGCCCCACCTGCCCCCAAGCCACCAGGCTGGGGAA  
GGAACGCTGTCAGAGGCCCTGCTGCAGCTGCAGTTTGTATGATGAAGACCTGGGGGCCTTGCTTGGC  
AACAGCACAGACCAGCTGTGTTACAGACCTGGCATCCGTCGACAACTCCGAGTTTCAGCAGCTG  
CTGAACCAGGGCATACCTGTGGCCCCCACAACTGAGCCCATGCTGATGGAGTACCCTGAGGCT  
ATAACTCGCCTAGTGACAGCCCAGAGGCCCCCCGACCCAGCTCCTGCTCCACTGGGGGCCCCGGGG  
CTCCCAATGGCCTCCTTTCAGGAGATGAAGACTTCTCCTCCATTGCGGACATGGACTTCTCAGCC  
CTGCTGAGTCAG TAA (SEQ ID NO:19)

#### PROTEIN SEQUENCE

MVYPYDVPDYAELPPKKRKVGIRIPGEKP YKCEECGKAFRQSSHLTTHKI IHTGEKP YKMECGK  
AFNRRSHLTRHQRIHTGEKP FQCKTCQRKFSRSDHLKTHTRHTGEKAAKFYLPDTDDRHRIEEK  
RKRTYETFKSIMKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQYPYFTSSLSTINYDEFPTMV  
FPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGE  
GTLSEALLQLQFDDLDLGNSTDPVFTDLASVDNSEFQQLNQGIPVAPHTTEPMLMEYPEA  
ITRLVTAQRPPDPAPAPLGAAPGLPNGLLSGDEDFSSIADMDFSALLSQ (SEQ ID NO:20)

FIG. 23

**K12\_A11**

RDHT-QSNV2-QTHR1-QFNR-kid

ATGGTGTACCCCTACGACGTGCCCGACTACGCCGAATTGCCTCCAAAAAGAAGAGAAAGGTA  
GGGATCCgaattccccggggaaaaaccgTTCCAGTGTAACCTTGTCAGCGAAAGTTCTCCCGG  
TCCGACCACCTGAAGACCCACACCAGGACTCATaccggggaaaaaccgTATGTTTGCTCAAAA  
TGTGGGAAAGCCTTCACTCAGAGTTCAAATCTGACTGTACATCAAAAAATCCACaccggggaa  
aaaccgTATGAGTGTACGATTGCGGAAAGTCCTTTAGGCAGAGCACCCACCTCACTCGGCAC  
CGGAGGATCCACaccggggaaaaaccgTATAAGTGTCAATGTGGGAAAGCCTTTATTCAA  
TCCTTTAACCTTCGAAGACATGAGAGAACTCACaccggtgaaaaagcgggccgctaaattcGTG  
TCAGTGACATTTGAAGATGTGGCTGTGCTCTTTACTCGGGACGAGTGGAAGAAGCTGGATCTG  
TCTCAGAGAAGCCTGTACCGTGAGGTGATGCTGGAGAATTACAGCAACCTGGCCTCCATGGCA  
GGATTCCTGTTTACCAAACCAAAGGTGATCTCCTGTTGCAGCAAGGAGAGGATCCCTGGTAA  
(SEQ ID NO:259)

MVYPYDVPDYAELPPKKRKVGIRIPGEKPFQCKTCQRKFSRSDHLKTHTRHTGEKPYVCSK  
CGKAFTQSSNLTVHQKIHTGEKPYECHDCGKSFRQSTHLTRHRRIHHTGEKPYKCHQCGKAFIQ  
SFNLRRHERHTTGEKAAAKFVSVTFEDVAVLFTRDEWKKLDLSQRSLYREVMLENYSNLASMA  
GFLFTKPKVISLLOQGEDPW (SEQ ID NO:260)

**FIG. 24**

**K44-16-E12**

QSHV-QSSR1-QTHR1-kid

ATGGTGTACCCCTACGACGTGCCCGACTACGCCGAATTG CCTCCAAAAAGAAGAGAAAGGTA  
GGGATCCgaattcccggggaaaaaccgTATGAGTGTGATCACTGTGGAAAATCCTTTAGCCAG  
AGCTCTCATCTGAATGTGCACAAAAGAACTCACaccgggggaaaaaccgTATAAGTGCCCTGAT  
TGTGGGAAGAGTTTTAGTCAGAGTTCCAGCCTCATTGCGCCACCAGCGGACACACaccgggggaa  
aaaccgTATGAGTGTACGATTGCGGAAAGTCCTTTAGGCAGAGCACCCACCTCACTCGGCAC  
CGGAGGATCCACaccggtgaaaaagcgggcgctaaattcGTGTCAGTGACATTTGAAGATGTG  
GCTGTGCTCTTTACTCGGGACGAGTGGAAGAAGCTGGATCTGTCTCAGAGAAGCCTGTACCGT  
GAGGTGATGCTGGAGAATTACAGCAACCTGGCCTCCATGGCAGGATTCCTGTTTACCAAACCA  
AAGGTGATCTCCCTGTTGCAGCAAGGAGAGGATCCCTGGTAA (SEQ ID NO:261)

MVYPYDVPDYAELPPKKRKVGIRIPGEKP YECDHCGKSFSQSSHLNVHKRTHTGEKP  
YKCPDCGKSFSQSSSLIRHQRTHTGEKP YECHDCGKSFRQSTHLTRHRRITHTGEKAAA  
KFVSVTFEDVAVLFTRDEWKKLDLSQRSLYREVMLENYSNLASMAGFLFTKPKVISLL  
QGEDPW (SEQ ID NO:262)

**FIG. 25**